

SPECIFIC MEMORANDUM OF AGREEMENT

BETWEEN

THE UNITED STATES DEPARTMENT OF ENERGY

AND

THE POWER REACTOR AND NUCLEAR FUEL DEVELOPMENT CORPORATION, JAPAN

IN THE AREA OF

COOPERATIVE MATERIALS DOSIMETRY FOR

LIQUID METAL COOLED FAST BREEDER REACTORS

This Agreement, to be called "The LMFBR Comparative Dosimetry Agreement," is made between the United States Department of Energy (hereinafter referred to as "DOE") and the Power Reactor and Nuclear Fuel Development Corporation, Japan (hereinafter referred to as "PNC") both hereinafter called the "Parties."

WHEREAS

DOE and PNC have agreed to cooperate in selected areas of applicable fast breeder reactor technology including Fuels and Materials under their Agreement in the field of LMFBRs signed on January 31, 1979 (hereinafter referred to as the "LMFBR Agreement") which superseded the Arrangement between the United States Atomic Energy Commission (USAEC) and PNC signed on March 4, 1969.

Pursuant to the Energy Reorganization Act of 1974, the USAEC was abolished and all functions transferred to and vested in the United States Energy Research and Development Administration (ERDA).

Pursuant to the Department of Energy Organization Act of 1977, ERDA was abolished and all functions transferred to and vested in DOE.

DOE and PNC have a mutual interest in irradiation testing of fuels and materials for LMFBRs.

DOE and PNC have a mutual interest in materials dosimetry, including a comparison of JOYO MARK I and EBR-II dosimetry, and a comparison of JOYO MARK II and EBR-II dosimetry.

DOE and PNC have a mutual interest in exchanging results of these dosimetry tests as well as their analyses.

IT IS AGREED AS FOLLOWS

#### ARTICLE 1 - OBJECTIVE

- 1.1 The objective of cooperation under this Agreement is to establish and to carry out a joint experimental and analytical program (hereinafter referred to as the "Program") to investigate the quantification of irradiation test fluences by means of materials dosimetry.
- 1.2 This cooperation shall be a joint project under and as envisaged by Article 3.7 of the LMFBR Agreement. Articles 6, 7, 8, 11, 12, 13 and 14 of the LMFBR Agreement are hereby incorporated by reference.

#### ARTICLE 2 - PROGRAM

A joint Program designed to meet the objectives of this Agreement has been agreed upon between the Parties and is given in Appendix I. In summary, the Program envisages:

- a. Irradiation in JOYO MARK I of selected dosimeters provided by DOE and PNC.
- b. Irradiation in EBR-II of selected dosimeters provided by PNC and DOE.
- c. Joint DOE/PNC dosimetry irradiations in JOYO MARK II.

- d. Exchange of each Party's dosimeter designs, test descriptions, irradiation histories, test results and analyses of these test results.

### ARTICLE 3 - PROVISION OF COMPONENTS AND SERVICES

3.1 To meet the requirements of the Program defined in Appendix 1, DOE shall at its own expense:

- a. Provide and ship to PNC a set of DOE dosimeters to be irradiated in the JOYO MARK I core.
- b. Provide and ship to PNC certain dosimeter materials in the form of Tantalum and, if available, very high purity Niobium for use by PNC in dosimetry experiments in JOYO MARK I.
- c. Provide an IAEA approved shipping container, subject to licensing approval to PNC by the Government of Japan, for shipment of dosimeter samples between DOE and PNC.
- d. Schedule the irradiation in EBR-II of PNC and DOE dosimeters and advise PNC when this schedule has been approved.
- e. Irradiate the PNC and DOE dosimeters in EBR-II.
- f. Recover, sort and count the irradiated PNC dosimeters and subsequently ship them to PNC.
- g. Provide to PNC, by the date of shipment from the U.S. of the irradiated PNC dosimeters, the following irradiation information:
  - (1) the exact location of corresponding DOE and PNC dosimeters in EBR-II.
  - (2) the best available calculated neutron spectrum for each dosimetry position, specified in a multigroup format.
  - (3) the irradiation history, including as a minimum the average or total power generated each day of the irradiation (MWd) and the time of shutdown.

- h. Provide to PNC the count data obtained from radiometric analyses of DOE and PNC dosimeters irradiated in EBR-II.

3.2 To meet the requirements of the Program defined in Appendix 1, PNC shall at its own expense:

- a. Provide to DOE the final design for DOE dosimeter capsules to be provided by DOE under Article 3.1.a. for subsequent irradiation in the JOYO MARK I core.
- b. Schedule the irradiation of PNC and DOE dosimeters in JOYO MARK I and notify DOE when this schedule is approved.
- c. Irradiate in the JOYO MARK I core the PNC dosimeters and the DOE dosimeters provided under Article 3.1.a.
- d. Irradiate in the JOYO MARK I reflector position a second set of DOE dosimeters previously provided to PNC.
- e. Recover, sort and count the irradiated DOE dosimeters and subsequently ship them to DOE.
- f. Provide and ship to DOE a set of PNC dosimeters to be irradiated in EBR-II.
- g. Provide to DOE, by the date of shipment from Japan of the irradiated DOE dosimeters, the following irradiation information:
  - (1) the exact location of corresponding PNC and DOE dosimeters in JOYO MARK I.
  - (2) the best available calculated neutron spectrum for each dosimetry position, specified in a multigroup format.
  - (3) the irradiation history, including as a minimum the average or total power generated each day of the irradiation (MWd) and the time of shutdown.

- h. Provide to DOE the count data obtained from radiometric analyses of PNC and DOE dosimeters irradiated in JOYO MARK I.
- i. Provide to DOE by January 1980 a detailed outline of PNC analysis and interpretation methods for neutron flux-spectrum determination for comparison with DOE methods.

3.3 The responsibilities of each of the Parties to carry out that portion of the Program concerning joint DOE/PNC irradiations in JOYO MARK II, as set forth in Article 2.c., shall be agreed upon by the Parties at a later date, and shall be the subject of an amendment to this Agreement or a separate Agreement.

#### ARTICLE 4 - MANAGEMENT

- 4.1 The DOE/PNC Joint Coordinating Committee, which was established pursuant to the exchange of letters between ERDA and PNC dated January 19, 1976 and March 5, 1976, and to Article 4 of the LMFBR Agreement, shall be responsible for the review, evaluation, assessment and approval of the Program to be conducted under this Agreement.
- 4.2 For periods between meetings of the DOE/PNC Joint Coordinating Committee, each Party shall designate one person to act on its behalf in all matters concerning cooperation under this Agreement.

#### ARTICLE 5 - FINANCIAL TERMS

- 5.1 DOE shall bear all costs of:
  - a. Nonfissile dosimeters required for activities specified within this Agreement.
  - b. Counting of JOYO MARK I and EBR-II irradiated dosimeter foils in the U.S.

- c. Providing EBR-II irradiation of dosimeters.
- d. Transfer of shipping cask to PNC.
- e. Performance of administration and technical work and its documentation at DOE sites by DOE contractor staffs.

5.2 PNC shall bear all costs of:

- a. Dosimeter capsule changes for JOYO MARK I.
- b. Counting of dosimeter foils in Japan.
- c. Providing JOYO MARK I irradiation of dosimeters.
- d. Transfer of shipping cask to DOE.
- e. Performance of administration and technical work and its documentation at PNC sites by PNC staffs.

5.3 The ability of the Parties to carry out their obligations is subject to the availability of appropriated funds.

ARTICLE 6 - ATTACHMENT OF STAFF

- 6.1 Short term visits of DOE staff to PNC and of PNC staff to DOE to discuss the technical aspects of this Agreement during the life of this Agreement shall be made at no cost to the Receiving Party.
- 6.2 Long term assignments of one month or more shall be the subject of separate personnel assignment agreements pursuant to Article 11 of the LMFBR Agreement.

ARTICLE 7 - PATENTS

Under the authority of Article 9.1.c. of the LMFBR Agreement, any invention or discovery made or conceived in the course of or under exchanges of personnel shall be governed by Article 9.1.a. of the LMFBR Agreement, and rights to other inventions or discoveries shall be distributed in accordance

with Article 9.1.b. of the LMFBR Agreement. Subparagraphs 2, 3 and 4 of that Article shall be applicable as appropriate.

#### ARTICLE 8 - DURATION

- 8.1 This Agreement shall enter into force upon signature, shall continue until September 30, 1981, and may be extended by mutual consent. The implementation and progress of the Program may be subject to review by the Parties.
- 8.2 This Agreement may be terminated at any time at the discretion of either Party upon 12 months advance notification in writing by the Party seeking to terminate the Agreement. Such termination shall be without prejudice to the rights which may have accrued under this Agreement to either Party up to the date of such termination.
- 8.3 All joint efforts and experiments not completed at the termination of this Agreement may be continued until their completion under terms of this Agreement.

Done at Tokyo, Japan in duplicate, this 26 day of December, 1979.

FOR THE UNITED STATES  
DEPARTMENT OF ENERGY

FOR THE POWER REACTOR AND NUCLEAR FUEL  
DEVELOPMENT CORPORATION, JAPAN

NAME: Billy Keri

NAME: Masami Iida  
Masami IIDA

TITLE: Representative, DOE

TITLE: Vice President